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SPRAYING TO CONTROL ANTHRACNOSE ON BLACK RASPBERRIES

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BY

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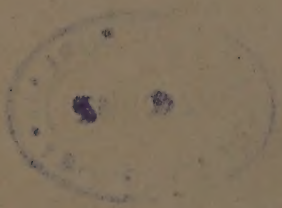


SPRAYING TO CONTROL ANTHRACNOSE ON BLACK RASPBERRIES

By W. C. DUTTON

The Horticultural Department began work in 1914, to determine the relative efficiency of various spraying materials to control anthracnose (*Plectodiscella veneta*)* on black raspberries.

Experiments at Eaton Rapids, 1914 and 1915

In 1914 and 1915 this work was done at Eaton Rapids in a field of Plum Farmer belonging to T. A. Farrand. The bushes were several years old. Proper pruning and cultivation were practiced regularly.

Materials. Four materials, as follows, were used:

Lime-sulphur
Soluble Sulphur**
Copper sulphate solution
Bordeaux

Each material was used for the different applications as listed below:

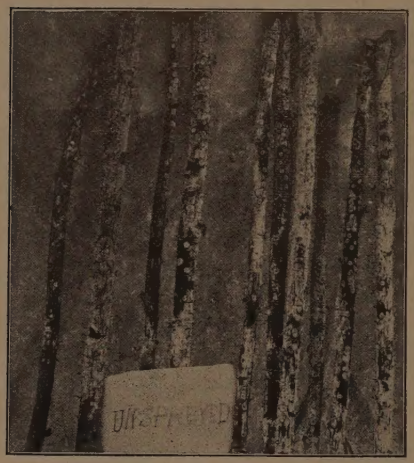
Material	Application	
	Dormant	Summer
Lime-sulphur	2½ gal. in 50	1¼ gal. in 50
Soluble sulphur	10 lbs. in 50	1 lb. in 50
Copper sulphate	3 lbs. in 50	1 lb. in 50
Bordeaux	4–4–50	4–4–50

*Until recently this has been known as *Gloeosporium venetum*.

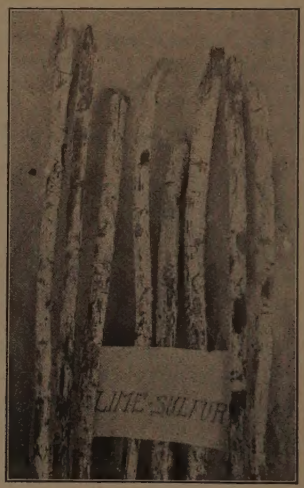
**A proprietary compound manufactured by The Niagara Sprayer Company.

The rows were 40 rods long. Alternate rows were sprayed, one with each material. The other rows were left as checks. The arrangement of the plots is shown in the accompanying chart. The rows were not sprayed their full length except the lime-sulphur row which was sprayed entirely for the dormant application only, as shown in the chart of the plots.

1. Lime-sulphur—x ..... x..Lime-S. dor. only
2. Unsprayed .....
3. Soluble Sulphur—x ..... x .....
4. Unsprayed .....
5. Copper sulphate—x ..... x .....
6. Unsprayed .....
7. Bordeaux—x ..... x .....
8. Unsprayed .....
9. Unsprayed .....



Unsprayed Plot



Lime.Sulphur Plot
(Three Applications)

Bordeaux Plot

Copper Sulphate Plot

Average Canes from Experimental Plots. 1914

Applications. In 1914, three applications were made as follows:

1st. April 4. Dormant application.
2nd. May 28. New shoots about 18 inches high.
3rd. Aug. 26. Old canes had been cut out.

In 1915, three applications were made at the following periods:

1st. April 17. Dormant application.
2nd. May 19. New shoots were 6 to 10 inches high.
3rd. June 14. Blossoms off. Shoots about 2 feet high.

No later applications were made as the bushes were to be pulled out after the berries were harvested.

Results in 1914. After the last application on August 26, the new canes in all plots were examined carefully and canes selected which seemed to be average ones for each plot. The canes from the different plots were then compared.

In all plots, sprayed and unsprayed, there was some anthracnose near the tips of the canes. The amount varied in different plots. The unsprayed plot showed most and the lime-sulphur plot least. This condition was probably caused by an infection during a period when the tips of the canes were not covered with spraying material.

There was a very marked difference in the condition of the lower parts of the canes. The canes in the row sprayed with lime-sulphur were practically free from anthracnose except a few spots near the tips. The portion of the row which had only the dormant application was in as good condition as the part sprayed three times.

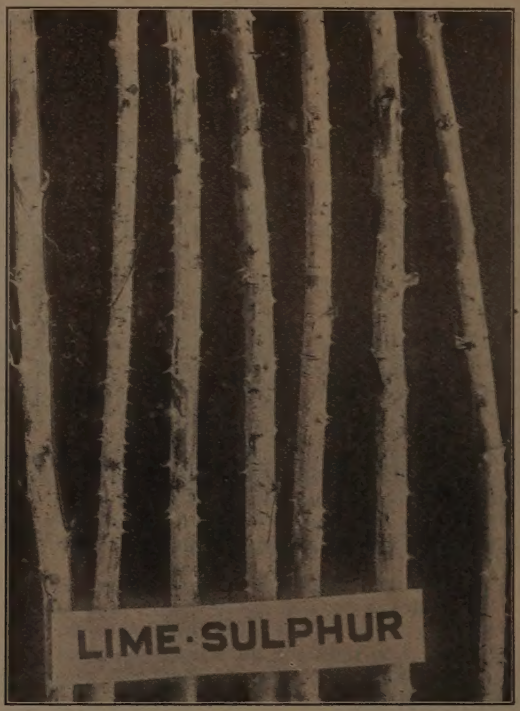
In the row sprayed with Soluble Sulphur, the canes showed much more anthracnose than where lime-sulphur was used. Bordeaux mixture gave poorer results than Soluble Sulphur and the row sprayed with copper sulphate solution was little better than the unsprayed row. Practically all the canes in the unsprayed row were quite badly affected. The upper and lower parts of canes showed about the same amount of the disease.

Results in 1915. The condition of the new growth was noted about the middle of August.

In the unsprayed row, nearly all the canes showed some anthracnose, most of them quite badly. The spots were much more numerous near the base than at the tips of canes.

Three applications of lime-sulphur gave better results than any other material. The results were uniformly good and very few of the diseased spots could be found on any of the canes in the plot. Where but one spraying was made, the disease was not serious but, of course, more common than when more treatments were applied.

Bordeaux mixture gave nearly as satisfactory results as three applications of lime-sulphur so far as the canes were concerned but the foliage was quite badly burned by the last application.



Canes from Plot Sprayed Three Times with Lime Sulphur. 1915.

Soluble Sulphur did not give as satisfactory results as lime-sulphur or bordeaux mixture.

Where copper sulphate solution was used, anthracnose was nearly as abundant as in the unsprayed row. The foliage was burned quite badly by the summer application.

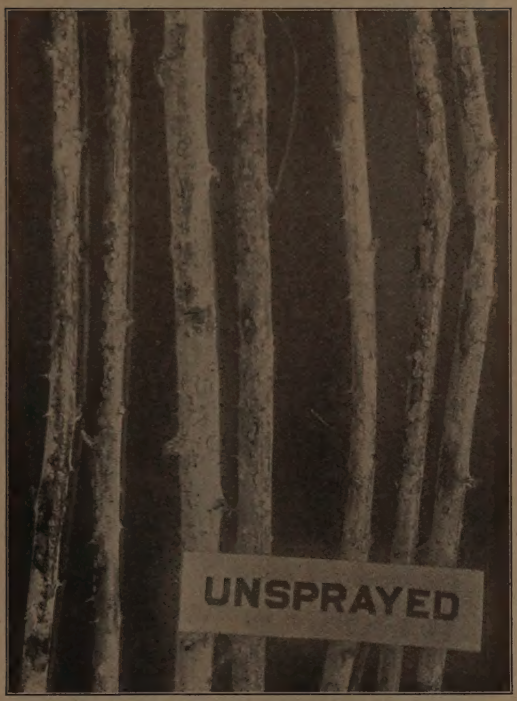
Conclusions from Experiments in 1914 and 1915

Three applications of lime-sulphur gave very satisfactory control of anthracnose in both 1914 and 1915, without any indication of foliage injury.

One dormant application of lime-sulphur gave good control in 1914, but was not so satisfactory in 1915.

Soluble Sulphur did not give satisfactory control, although the disease was checked to some degree.

Bordeaux mixture gave fair control in 1915 but not in 1914. When made by the 4-4-50 formula, it is not always safe to use because of foliage injury.



Canes from Unsprayed Plot. 1915

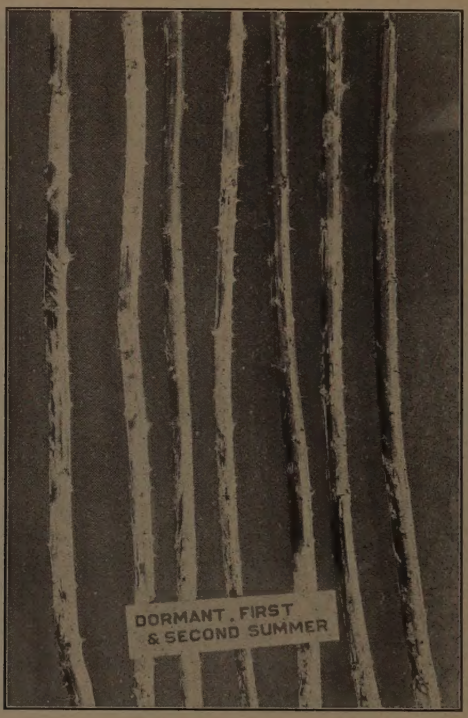
Copper sulphate solution failed almost entirely to control the anthracnose. It also burned the foliage quite badly.

Experiments in 1917

The raspberry spraying experiments were continued in 1917 at Leslie in a field of Plum Farmer belonging to E. W. Potter.

The plants had been set five years and were quite badly diseased with anthracnose. There were sixteen rows about twenty rods long.

Materials Used. As the results obtained at Eaton Rapids in 1914 and 1915 indicate quite strongly that lime-sulphur will give as good or better results than any of the other materials used, no other material than lime-sulphur was used in the experiments in 1917. The object of the work was to determine how many applications are necessary to give satisfactory control of anthracnose.



Canes from Plot Sprayed Three Times. 1917

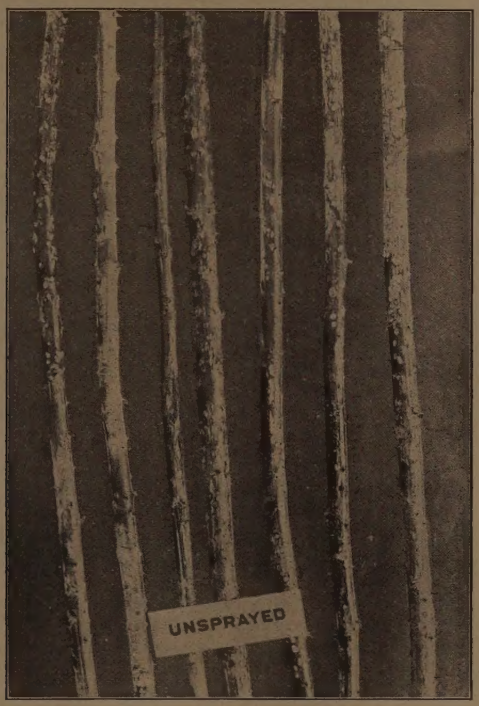
Applications. Applications were made at three periods and are designated as follows:

1. Dormant. Before growth started.
2. First summer. When new shoots were 6 to 10 inches high.
3. Second summer. Just before blooming period.

For the dormant application, the lime-sulphur was diluted at the rate of 2½ gallons in 50 and for the summer applications at the rate of 1¼ gallons in 50.

The field was divided into six plots, each plot being sprayed at the periods indicated below. Each plot consisted of three full rows except the unsprayed plot which had only one row.

Plot I—Dormant application only.
Plot II—Dormant and first summer applications.
Plot III—Dormant, first and second summer applications.
Plot IV—First and second summer applications.
Plot V—First summer application.
Plot VI—Unsprayed.



Canes from Unsprayed Plot. 1917

Results. The control in 1917, even when three applications were made, was not quite so good as was secured in 1914 and 1915, with three applications of lime-sulphur. There was a rank growth of June grass well up around the canes. The soil between the rows was cultivated but the grass in the rows was not cleaned out. This condition was undoubtedly responsible for the poorer control as moisture was held in the rank growth of grass.

In spite of the unfavorable conditions, the control in some plots was very satisfactory. It had been planned to make definite counts of diseased canes but this was not practical because of the uneven infection probably caused by the undesirable cultural conditions. A general statement of the condition of the canes in each plot follows.

Plot III, which was sprayed three times, showed very little anthracnose.

Plot II, which had the first two applications and Plot IV which had the second and third applications, both showed slightly more anthracnose than Plot III.

Plot I, which had only the dormant application and Plot V only the first summer application, were diseased somewhat worse than Plots II and IV, but their condition was much better than that of the unsprayed row.

In the unsprayed row, nearly all the canes were badly spotted with anthracnose.

Summary. Three applications gave satisfactory results. Two applications, regardless of the time made, failed to give results as good as were secured with three applications. One application, either before or after growth started, showed some results but not so good as when sprayed a greater number of times.

Conclusions

The results of these experiments show that anthracnose on black raspberries can be satisfactorily controlled with lime-sulphur. To insure success at least three applications should be made as follows:

1st. In spring before growth starts. Use lime-sulphur diluted at the rate of 2½ gallons in 50.

2nd. When new shoots are 6 to 8 inches high. Use lime-sulphur diluted at the rate of 1¼ gallons in 50.

3rd. Just before blooming period. Use lime-sulphur diluted at the rate of 1¼ gallons in 50.

Clean cultivation should be practiced. Weeds in the rows will hold moisture, making conditions favorable for anthracnose development. The bearing canes should be removed as soon as the fruit is harvested.

Acknowledgment

Credit is due Mr. T. A. Farrand, of Eaton Rapids, and Mr. E. W. Potter, of Leslie, for their co-operation in this work.